

## Claims

1. A homogeneous multilayer structure comprising:  
a plurality of substrate layers defining  
levels and having surfaces;

5 a plurality of metal layers disposed on said  
surfaces of plurality of substrate layers;

a plurality of groundplanes comprising a  
first subset of said plurality of metal layers connected by  
a first plurality of conductors; and

10 at least one coupler comprising a plurality  
of coupler segments, wherein said plurality of coupler  
segments comprises a second subset of said plurality of  
metal layers connected by a second plurality of conductors,  
and wherein at least two of said plurality of coupler  
15 segments are on different levels.

2. The homogeneous multilayer structure of claim  
1, wherein said plurality of substrate layers comprise a  
polytetrafluoroethylene composite.

3. The homogeneous multilayer structure of claim  
20 1, wherein said first plurality of conductors and said  
second plurality of conductors comprise via holes.

4. The homogeneous multilayer structure of claim  
1, wherein said second plurality of conductors comprises  
slabline transmission lines.

5. The homogeneous multilayer structure of claim 1, wherein said at least one coupler has a frequency of operation between approximately 0.5 GHz and approximately 6.0 GHz.

5           6. The homogeneous multilayer structure of claim 1, wherein said at least one coupler is a wideband coupler.

7. The homogeneous multilayer structure of claim 6, wherein said wideband coupler is a non-uniform coupled structure.

10           8. The homogeneous multilayer structure of claim 6, wherein said wideband coupler is a Cappucci coupler.

9. A method of manufacturing a coupler comprising the steps of:

15           manufacturing a plurality of substrate layers;

            etching at least five metal layers, comprising a first metal layer, a second metal layer, a third metal layer, a fourth metal layer, and a fifth metal layer, disposed on at least a subset of said plurality of  
20   substrate layers, wherein said second metal layer is part of a segment of a coupler and is between said first metal layer and said third metal layer, said third metal layer is between said second metal layer and said fourth metal layer, and said fourth metal layer is part of another segment of a

coupler and is between said third metal layer and said fifth metal layer;

connecting said third metal layer to said first metal layer and said fifth metal layer to form  
5 groundplanes; and

connecting said second metal layer to said fourth metal layer to form a coupler.

10 10. The method of manufacturing a coupler of claim 9, wherein said plurality of substrate layers comprise a polytetrafluoroethylene composite.

11. The method of manufacturing a coupler of claim 9, wherein via holes are used to connect at least two of said at least five metal layers.

15 12. The method of manufacturing a coupler of claim 9, wherein slabline transmission lines are used to connect at least two of said at least five metal layers.

13. The method of manufacturing a coupler of claim 9, wherein said coupler has a frequency of operation between approximately 0.5 GHz and approximately 6.0 GHz.

20 14. The method of manufacturing a coupler of claim 9, wherein said coupler is a wideband coupler.

15. The method of manufacturing a coupler of claim 14, wherein said wideband coupler is a non-uniform coupled structure.

16. The method of manufacturing a coupler of claim 14, wherein said wideband coupler is a Cappucci coupler.

17. A homogeneous multilayer structure comprising:

substrate means for defining levels and  
10 surfaces;

metal layer means disposed on said surfaces to define a plurality of conducting layers;

grounding means comprising a first subset of said plurality of conducting layers;

15 first conducting means for connecting said grounding means; and

coupler means comprising a plurality of coupler segment means, wherein said plurality of coupler segment means comprises a second subset of said plurality of  
20 conducting layers, and wherein at least two of said plurality of coupler segment means are on different levels.

second conducting means for connecting said coupler segment means.

18. The homogeneous multilayer structure of claim 17, wherein said substrate means comprises a polytetrafluoroethylene composite.

19. The homogeneous multilayer structure of claim 17, wherein said first conducting means and said second conducting means comprise via holes means.

20. The homogeneous multilayer structure of claim 17, wherein said second conducting means comprises slabline transmission line means.

21. The homogeneous multilayer structure of claim 17, wherein said coupler means has a frequency of operation between approximately 0.5 GHz and approximately 6.0 GHz.

22. The homogeneous multilayer structure of claim 17, wherein said coupler means is a wideband coupler.

23. The homogeneous multilayer structure of claim 22, wherein said wideband coupler is a non-uniform coupled structure.

24. The homogeneous multilayer structure of claim 22, wherein said wideband coupler is a Cappucci coupler.

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